Strategy Research Project

WATER: US STRATEGIC RESPONSE TO CONFLICTS OVER A FINITE RESOURCE

BY

LIEUTENANT COLONEL THEODORE W. MUNCHMEYER
United States Air Force

DISTRIBUTION STATEMENT A:
Approved for Public Release.
Distribution is Unlimited.

USAWC CLASS OF 2009

This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

U.S. Army War College, Carlisle Barracks, PA 17013-5050

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 MAR 2009		

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Water: US Strategic Response to Conflicts Over a Finite Resource	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
Theodore Munchmeyer	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
U.S. Army War College ,122 Forbes Ave.,Carlisle,PA,17013-5220	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT
see attached

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**		**34**	

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
25-02-2009	Strategy Research Project	

4. TITLE AND SUBTITLE

Water: US Strategic Response to Conflicts Over a Finite Resource

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Lieutenant Colonel Theodore W. Munchmeyer

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Paul R. Kan, Ph.D
Department of National Security and Strategy

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army War College
122 Forbes Avenue
Carlisle, PA 17013

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution A: Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
Useable water is a limited commodity needed to sustain life. Nations throughout history have threatened the use of force on each other over access, quality and the quantities drawn from shrinking available sources. Many current publications argue future wars will result not from access to oil, but from disagreements on finite water resources.

However, despite the rhetoric, few if any conflicts can be considered the sole reason for nations to have gone to war over. Water access may be a contributing factor but not the definitive reason for conflict to arise. In fact, many riparian nations have improved relations due to their mutual dependency on useable fresh water.

The Unites States should develop a proactive strategy to enhance its role in forging partnerships and agreements between nations on access to fresh useable water. This would grant the US positive soft power influence in many turbulent regions of the world. The upcoming National Security Strategy should include the characteristics of potential water-based conflicts and how the US can leverage its abilities to resolve such concerns as well as use the situation as a springboard for settling larger security issues.

15. SUBJECT TERMS
Limited Natural Resource, Environment, National Security Strategy

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFED	UNCLASSIFED	UNCLASSIFED	UNLIMITED	34	

USAWC STRATEGY RESEARCH PROJECT

WATER: US STRATEGIC RESPONSE TO CONFLICTS OVER A FINITE RESOURCE

by

Lieutenant Colonel Theodore W. Munchmeyer
United States Air Force

Paul R. Kan, Ph.D.
Project Adviser

This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

AUTHOR: Lieutenant Colonel Theodore W. Munchmeyer

TITLE: Water: US Strategic Response to Conflicts Over a Finite Resource

FORMAT: Strategy Research Project

DATE: 25 February 2009 WORD COUNT: 6,168 PAGES:34

KEY TERMS: Limited Natural Resource, Environment, National Security Strategy

CLASSIFICATION: Unclassified

Useable water is a limited commodity needed to sustain life. Nations throughout history have threatened the use of force on each other over access, quality and the quantities drawn from shrinking available sources. Many current publications argue future wars will result not from access to oil, but from disagreements on finite water resources.

However, despite the rhetoric, few if any conflicts can be considered the sole reason for nations to have gone to war over. Water access may be a contributing factor but not the definitive reason for conflict to arise. In fact, many riparian nations have improved relations due to their mutual dependency on useable fresh water.

The Unites States should develop a proactive strategy to enhance its role in forging partnerships and agreements between nations on access to fresh useable water. This would grant the US positive soft power influence in many turbulent regions of the world. The upcoming National Security Strategy should include the characteristics of potential water-based conflicts and how the US can leverage its abilities to resolve such concerns as well as use the situation as a springboard for settling larger security issues.

WATER: US STRATEGIC RESPONSE TO CONFLICTS OVER A FINITE RESOURCE

> Wars fought over water do not solve anything. Gunfire will not drill wells to irrigate the thirsty land, and after the dust of war has settled, the original problems remain.[1]
>
> —Shimon Peres, 1993

Background

Water is a natural resource unlike any other; a ubiquitous simple substance many people and nations take for granted. Humans and animals need water for basic survival. Unlike oil, food or metals, life is physically impossible without water within days. It is a plentiful material in raw form that despite covering over 75 percent of the earth's surface, roughly three percent is fresh water[2] and only one percent is actually economically useable for industrial and agriculture purposes.[3] Even less of this precious natural resource is actually available for human consumption as shown in Figure 1.

	Volume (km^3)	*%*
Oceans	1 348 000 000	97.39
Polar icecaps, icebergs, glaciers	27 820 000	2.01
Groundwater, soil moisture	8 062 000	0.58
Lakes and rivers	225 000	0.02
Atmosphere	13 000	0.001
Total	1 384 120 000	100
Freshwater	36 020 000	2.6
Freshwater as % of its total		*%*
Polar icecaps, icebergs, glaciers		77.23
Groundwater to 800m depth		9.86
Groundwater from 800m to 4 000m depth		12.35
Soil moisture		0.17
Lakes (fresh water)		0.35
Rivers		0.003
Hydrated earth minerals		0.001
Plants, animals, humans		0.003
Atmosphere		0.04
Total		100

Figure 1 - Water Availability[4]

Throughout history, communities have located close to natural fresh water resources to meet their domestic needs and trade networking. Since many communities are downstream from other groups, tensions mount when water becomes unusable or restricted. More than 260 river basins are international and thirteen of them are shared by five countries or more.[5] Currently, there are ongoing tensions in several parts of the world over access to fresh water including the Tigris and Euphrates River basin, the Nile, the Indus, the Mekong, the La Plata, the Jordan and several freshwater basins in southern Africa. Whether such disputes or conflicts rose due to adverse weather conditions, increased competitive usage or pollution of accessible supplies, history demonstrates water availability is a security concern to most nations.

Even within the United States, there are many examples of water disputes. Early in the twentieth century, the Governor of Arizona called the National Guard to prevent California from taking more than its fair share of the Colorado River.[6] Access to the western United States underground aquifers has always been a political football between farmers and growing communities. Even the recent droughts in the southern United States pitted states against each other for access to the Tennessee River. Due to such desperate drought conditions, the region even appealed to the Federal Government for relief from the Endangered Species Act, which required enough effluent flow for the threatened mussels and sturgeon in the Apalachicola River.[7] Although the Federal Government refused, the request demonstrated how important fresh water access can be even in a developed nation.

It the past two decades, a host of books, scholarly reports and newspapers have concluded that the next major group of conflicts will not be about oil or land but access

to fresh water. Former United Nations Secretary General, Boutros-Boutros Ghali, stated in 1988 when he was Egypt's Minister of State for Foreign Affairs, "The next war in our region will be over the waters of the Nile, not politics."[8] Turkey and its southern riparian neighbors trade barbs and threats of military action over three rivers that criss-cross the shared mountainous region. The booming population in the Middle East exacerbates an already tense situation between Israel and its neighbors on surface and underground aquifers. The Jewish state has repeatedly warned it will use military action to ensure its current share of available water despite the fact it uses nearly three times the amount Palestinians receive.[9]

These documents and statements further point to the environmental stress placed on current water sources and argue that it is merely a matter of time before nations will go to war to protect their vital access to such a commodity. Such experts therefore conclude that environmental pressure could increase the level of stress within regional politics, increasing the likelihood of many different kinds of disputes and impeding resolution of water resource issues.[10]

Despite evidence that communities or nations will resort to war over water, the United States has not expressed such concerns in the current national security statements or documentation. In the most recent version of the National Security Strategy published in 2006, the George W. Bush administration does not acknowledge the possibility of water related conflict and only briefly mentions the possibility of wars over natural resources other than oil. Furthermore, there is no mention of the need to monitor, ascertain or mediate these types of growing escalations despite obvious contemporary concern over conflicts related to access to oil, spread of democracy and

need to resolve future conflicts peacefully. This apparent disconnect begs the question: Does the United States believe that water will be the root cause of future conflicts? Many experts question the wisdom of not addressing this situation especially given the need for all human life to have access to fresh water.

This paper will discuss the current situation of water related disputes and conflicts such as the Nile River, the Tigris and Euphrates River Basin, the Indus River Valley, the Colorado River, the Okavango River, the La-Plata River Basin and the Jordan River. Each riparian situation has a unique scenario around the world where this paper provides how the United States may play a diplomatic or military role to remedy such turbulent issues as water use and access. Furthermore, this paper will determine if the US National Security Strategy should include water conflicts, and if so how such situations may be addressed.

Case Study: The Nile River

Arguably, the most well-known confrontation over access to fresh water is the long struggle over the use of the Nile River. As shown in Figure 2, this ribbon of water flows northward through ten countries on various tributaries from central and eastern Africa ending its journey in the Mediterranean Sea over four thousand miles away.[11] Much of this water begins from highlands in the African Great Lakes region and the lakes of western Ethiopia where little of the Nile's waters are currently utilized beyond subsistence farming and simple trading. It is farther downstream in the Sahara Desert where the growing dispute has brewed for well over a century.

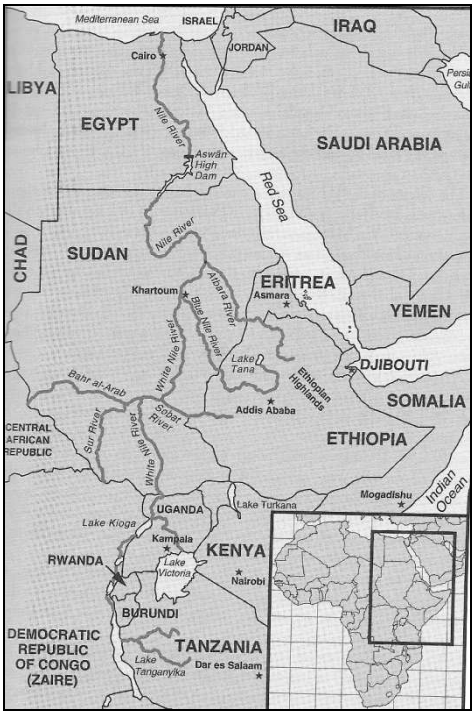

Figure 2 – The Nile River[12]

The dispute began with Egypt's growing needs. In the late nineteenth century, Egypt and Britain achieved full control over the Nile basin by signing treaties with all upstream riparian nations establishing that no projects could be constructed on the Nile without prior Egyptian and British approval. This pact was enforced over the other countries and their respective colonial masters by the military superiority of Great Britain.[13] Given the facts that most African riparian nations at the time had minimal needs for infrastructure development, these nations were not significantly impacted. Additionally, the Sudan at the time currently a protectorate of Britain, ensuring few problems would arise, especially since Britain favored the development of Egypt's cotton resources over its other colonial riparian's requirements.[14]

However as World War II ended and the African nations became independent, this Victorian Era arrangement soon encountered serious problems. Sudan and

Ethiopia both had plans to dam, barrage or divert the Blue and White Nile Rivers respectively for various reasons including agriculture, navigation and flood control. Egypt strongly protested these actions and threatened military action if these projects were not halted, immediately claiming their right to the waters of the Nile would be adversely affected. In 1978 for example, President Anwar Sadat said he would attack any state that seized Egypt's water. It is easy to note that Egypt assumed any water that at one time flowed or could flow into its territory as its own resource.

Egypt has reemphasized this threat routinely and even expanded the threat to nations such as Israel who in 1990 assisted Ethiopia in planning water development projects on the Nile.[15] Both Ethiopia and Sudan halted any construction of the current projects; however, each nation routinely stated they reserve the right to develop their portions of the Nile for their own growing needs.[16] In the past twenty years, other riparian nations farther upstream have also begun to consider development of their own piece of the Nile.

Much of the saber rattling from Egypt stems from their historic role of using the Nile. Egypt is a desert nation with little access to fresh water other than the Nile. Furthermore, 96 percent of Egypt's population lives on the Nile River and the nation has grown substantially just in the past few decades.[17] Even with the completion of the Aswan Dam forty year ago, Egypt's future demands for power production and fresh water will soon exceed the amount that can be delivered. It is little wonder why Egypt threatens its upstream neighbors with military force to ensure the water from the Nile tap does not diminish.

Case Study: The Tigris and Euphrates River Basin

Another current water-based hotspot stems from the water dispute involving Syria, Iraq and Turkey. Several rivers in the region including the biblical Tigris and Euphrates Rivers flow through each country, and all three nations claim to have vital increasing demands for irrigation and power production. For the past fifty years, there have been numerous squabbles, which based on historic reports, virtually spilled into open war between regional nations.

The Tigris and Euphrates Rivers originate in the highlands of eastern Turkey as shown in Figure 3. Since the formation of the modern, secular Turkish state, Turkey has drafted plans to dam and control the flow of these rivers, especially the Euphrates River. This arrangement worked for years since Iraq did not draw considerable water from the Euphrates and Syria was still an underdeveloped protectorate under French control with some of its needs being met from the smaller Kuveik River that originates in Syria. However, in the recent past, each nation has demanded a larger percentage of the basin for its growing fresh water requirements. Syria's population is growing by 3.3 percent each year and already depends upon the Euphrates River for 85 percent of its meager needs.[18] Iraq as well needs vast amounts of clean water for irrigation and development needs now that it can focus on helping its population rather than keeping a dictator in power.

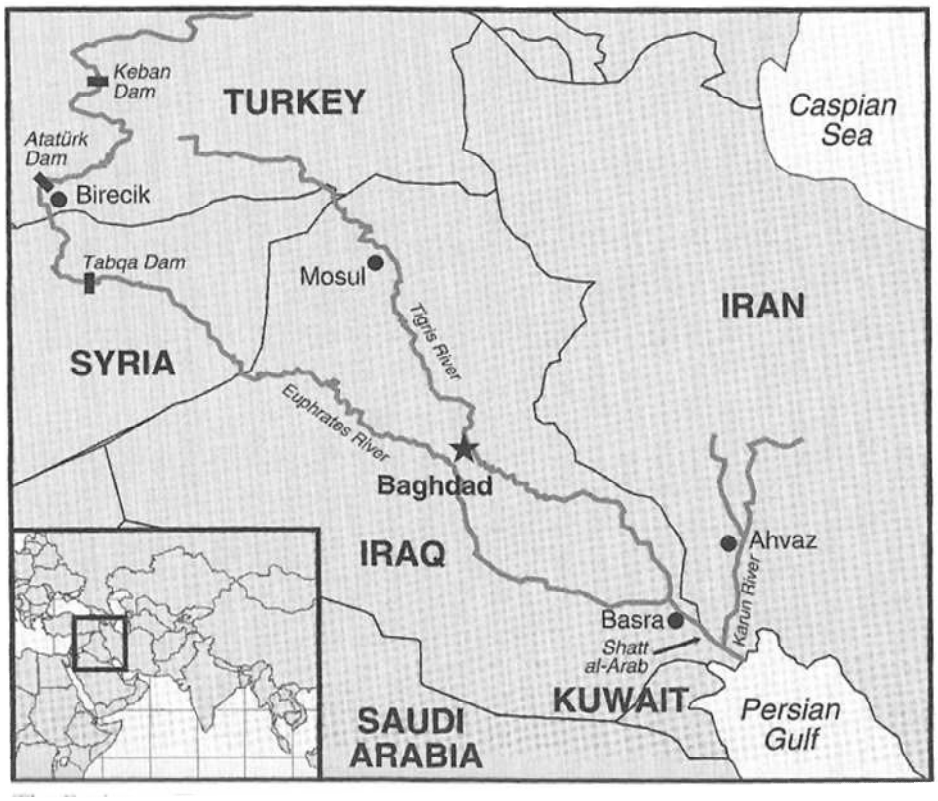

Figure 3 – Tigris and Euphrates Rivers[19]

Much of the problem stems from the fact that the Tigris and Euphrates Rivers are the only major source of fresh water for much of the Middle East. Although both Syria and Turkey have other sources of fresh water available, Iraq depends solely on this basin.[20] Additionally, Syria's needs for fresh water have grown to the point that it demands a much larger share of both rivers. In total, each nation's current claims for a portion of the basin's waters exceed over 148 percent of normal flow on the Euphrates River and 111 percent of normal flow for the Tigris River.[21]

Since 1962, several dams or diversions have been constructed by each nation, sometimes in consultation with other riparian nations, but always for the needs of the country completing the construction. In almost every instance regional tensions increased; whether it was the result of temporary restricting flows for filling reservoirs or

a political move to project power through either water or oil resources.[22] It is little wonder why each time one nation began designing or constructing a dam, another downstream nation would raise the specter of attacking or sabotaging construction, claiming the waters of these rivers would be stolen and thus leaving their downstream populations to suffer.

The rhetoric has only become louder since the fall of the Saddam Hussein dictatorship in 2003 resulted in America now having two important partners relying on these major fresh water sources. The United States cannot take sides on this issue, especially since both nations are important allies in the region and play pivotal roles in other ongoing regional problems. During the Cold War, the United States would strongly back one country, hoping to leverage their position for other political gains and bolstering its image to allies in the region. However, access to water is important to development and without a dependable source, conflict is possible between US allies. This in turn will mean the destabilizing situation will endure and US efforts will either remain predominantly military or retreat from progressive diplomatic and economic efforts. Given the nature of water related conflicts and the fragility of the entire Middle-East region, the failure to address this particular situation risks affecting United States national security.

Opposing Viewpoint

These intractable water issues between neighbors in a cantankerous region did not lead to genuine conflict over water. Despite the realist mentality that water related conflicts are inevitable, there have been contradictory views on whether such wars will actually occur. Review of past disputes where it was assumed that water resources

caused conflict point to water accessibility or need as merely a symptom of a larger problem. Water wars, based upon this position, cannot be assumed in isolation to be the reason for conflict. In fact, most of these conflicts stemmed from larger or more complicated issues such as religious beliefs or perceived power struggles within the geographical area.

Beyond the previously covered two case studies, there have been other potential hotspots that did not explode. For example, the Indus River basin (Figure 4) flows mainly through Pakistan through five major tributaries and empties into the Indian Ocean near the port megacity of Karachi. The Indus River valley is where roughly 80 percent of Pakistan's population resides and is where the vast majority of water used for drinking, industry and agriculture originates. On average, over 1.7 million gallons of water per second flows down the spine of the country providing the vast majority of water needs to a growing third-world nation.[23]

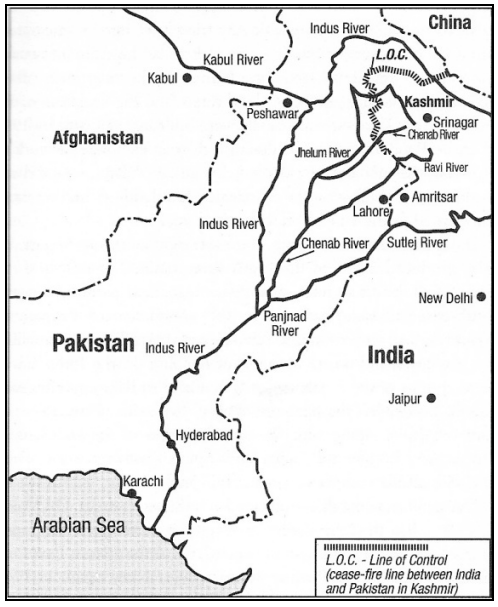

Figure 4 – Indus River[24]

Four of these smaller tributaries rivers, the Jhelum, Chenab, Ravi and the Sutlej Rivers begin in neighboring India or the disputed India controlled Kashmir Region. India, which has gone to war four times with Pakistan since the two countries separated in 1947, has used water as a strategic weapon against its riparian neighbor to the south. In early 1948 for example, India cut off the flow of water to several important canals within Pakistan, destroying over one million acres of farmland and inducing a famine in the newly created nation. Tensions rose to such a point that even though India fully restored the flow of its tributaries within two months, Pakistan considered military action against India for what it considered a provocation. Nonetheless, military action was not taken.

The ongoing dispute obligated each country to forgo any intention of integrating the use of the Indus forcing both to diminish their dependence on sharing resources.[25] The dispute continues with India claiming that the waters from these tributaries are necessary for their populations in their partition of Kashmir, while Pakistan argues the downstream flow entering their borders is less than adequate and severely polluted.

It can be argued that although water is important to both countries, it is not likely India and Pakistan will go to war solely on water resources in the future. In fact, water in this case was a way that assisted in resolving the complex ethnic, religious and cultural issues that have enflamed the passions of both nations in the past. Since the British partitioning of 1947 the two countries have gone to war based upon border disputes and ethics clashes, not water. Since both nations rely on the Indus for various reasons, negotiation over its use have actually strengthened relationships and reduced the potential for conflict.

A dispute over access to limited resources is not necessarily a terrible predicament. Such strife can produce useful change in distribution patterns and governance of scarce natural commodities. It can also stimulate technological innovation and force confronting states to work out issues or receive international mediation.[26] In 1960 for instance, India and Pakistan, with the assistance of the World Bank, established the Indus Water Commission to find common ground and determine ways to avert confrontations over scarce water resources. Although this agreement did not integrate the two countries water resource programs, it nevertheless reduced the potential flashpoint caused by limited resources used by both parties.[27] Other nations in similar situations have followed, resulting in more than twice the number of interactions over water resources being positive rather than negative.[28]

Another positive case in point is the current agreement between the United States and Mexico dealing with the Colorado River (Figure 5). Once considered one of the wildest rivers, the Colorado was tamed in the early 20th century in the US with various dams and reservoirs producing electricity, creating leisure areas and providing potable water for the burgeoning southwest. The river runs over 1,400 miles draining nearly 250,000 square miles before emptying into the Sea of Cortez in northern Mexico.[29]

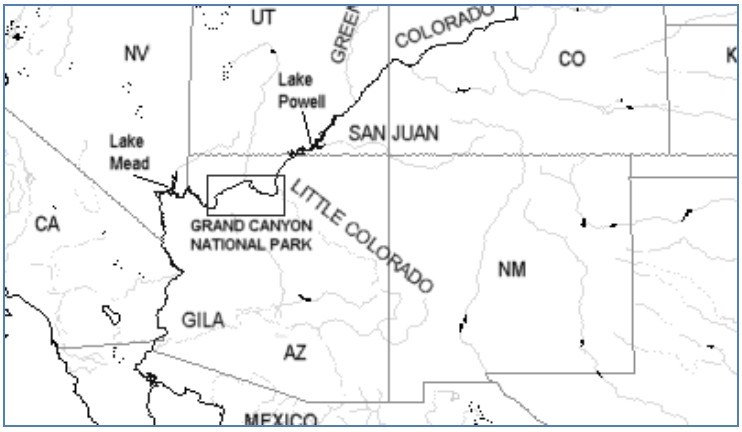

Figure 5 – Colorado River[30]

When the dams were originally designed and built, little attention went to the downstream residents, which included people living in Mexico. The Colorado River was reduced to a trickle resulting in higher levels of salinity and very poor water quality for the water that managed to make its way beyond the dams. Starting in the mid-1950s, the Colorado at times actually began to dry up before reaching the estuaries just over the Mexican border[31] due to the increasing needs of the US for agriculture and population growth.

Just as with earlier battles between California and Arizona, low-level conflict was plausible until the US agreed to provide desalination facilities that supplied Mexico with at least 1.8 cubic kilometers of drinkable water annually.[32] Unfortunately, some negative results could not be reversed. By the time of the agreement, the estuary area no longer supported the unique wildlife that was common decades ago and many people and industries were displaced due to the river being removed. Although not the perfect solution, the process averted a potential conflict where Mexico received justifiable compensation for the lack of its natural resource. Such negotiations led to

better understanding of the fragile ecosystem of the river and more cooperation on how to best use the Colorado.

Opposing Case Study: Okavango River

Disputes over the use of rivers may appear to be timeless with many of the headlines focusing on major rivers that significantly affect the development of the only source of fresh water for several riparian nations. However, conflict arises when the needs of a country, no matter how underdeveloped, finally reach a tipping point. This usually occurs when a nation takes more water than surrounding nations believe is acceptable for their own survival. However, even in cases of the most impoverished nations where survival is in the balance, disputes can be resolved.

A solid success story of dispute aversion is currently occurring in southern Africa where three nations are presently working on a strategy to share the inland Okavango River. As shown in Figure 6, this unique river begins in the highlands of Angola and briefly enters the Caprivi Strip of Namibia before evaporating in the swaps of northwestern Botswana. This river is the only oasis in a particularly arid part of southern Africa. It includes parts of the Kalahari Desert and has minimal development due to its unique location and the fact the river never reaches an ocean or populated area.[33]

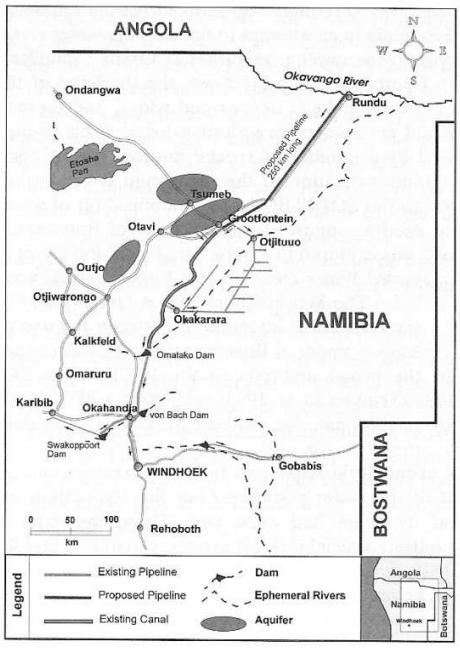

Figure 6 – Okavango River[34]

In the late twentieth century, both downstream riparian nations set on a course to minimize evaporation losses from the Okavango, and develop it for their own use. Botswana began looking at minimizing evaporation losses and using the river for mining operations in the 1980s by dredging parts of the river. After receiving independence in the early 1990s, Namibia also looked at piping much of the Okavango to supply water to its capital, Windhoek.[35]

Both nations feared the other's plans would endanger its rights to use the Okavango for its emerging needs. Namibia was in the middle of a terrible drought and Botswana has considerable water needs to expand burgeoning mining operations. Similarly, Angola, a nation that just emerged from a long civil war, was thought to consider withdrawing large volumes of fresh water from the Okavango for post-war construction.[36]

Green Cross International (GCI), a NGO with knowledge of simmering disputes and potential conflicts, noted the potential for increased hostilities and focused part of its role in the Water for Peace program as the Angolan civil war came to an end. GCI used the leverage of South African water resource professionals, experts in conflict resolution from the Woodrow Wilson Center and the British Broadcasting Corporation to force the three nations to work together to find common ground.

Through the formation of the Okavango River Basin Water Commission (OKACOM), the GCI facilitated talks between riparian nations that made each comprehend that individual national solutions and even water sharing would not resolve the existing crisis. Each nation's needs would far overweigh the basin's available water supply. Instead, OKACOM met routinely to discuss and propose water partnerships that would realize common benefits and best business practices that would give the best regional results for the Okavango's use.[37] This process has resolved a potential conflict and made each nation aware of the requirements of the others.

The Ever-Changing Dynamics of Potential Conflict Over Water

Yet despite these successes, each situation shows the vulnerabilities of future conflict still emerging or metastasizing from larger strife between nations. The Indus River Treaty signed between Pakistan and India originally occurred in 1960 when both nations were relatively new at self-government and neither had the ability to inflict catastrophic devastation if war broke out. Since then, populations in both countries have more than quadrupled, creating stressful conditions in an already hostile region. Additionally, India has already drawn down many of its aquifers in northern India; the

economic and social pressures may force these riparian nations to readdress the partitioning of the Indus tributaries.[38]

Other river agreements also have had their original success overcome due to changing dynamics. For example, the countries of Brazil, Argentina and Paraguay were once hailed for their successful resolution of the damming of the La-Plata River basin where massive amounts of locally produced electricity have aided each country in their goal of modernizing the region. For Paraguay, electricity production is the number one export and provides a much needed positive cash flow to a relatively poor and landlocked nation.

The rivers of central South America all move south and eastward from the Andres Mountains through the central highlands of Bolivia, Brazil and Paraguay emptying in the southern Pacific Ocean via Argentina (Figure 7). Until recently, this untamed river system forms many national borders in dense grasslands and jungles that have been the source of regional wars and civil strife since independence from their colonial masters. This collection of converging waters, commonly referred to as the La-Plata River Basin, brings vital supplies to the interior of the continent. Through massive public funding of hydroelectric projects in the 1980s, the La-Plata bolstered the region with exportable power generation and development of a significant portion of one of the most remote areas of the continent.

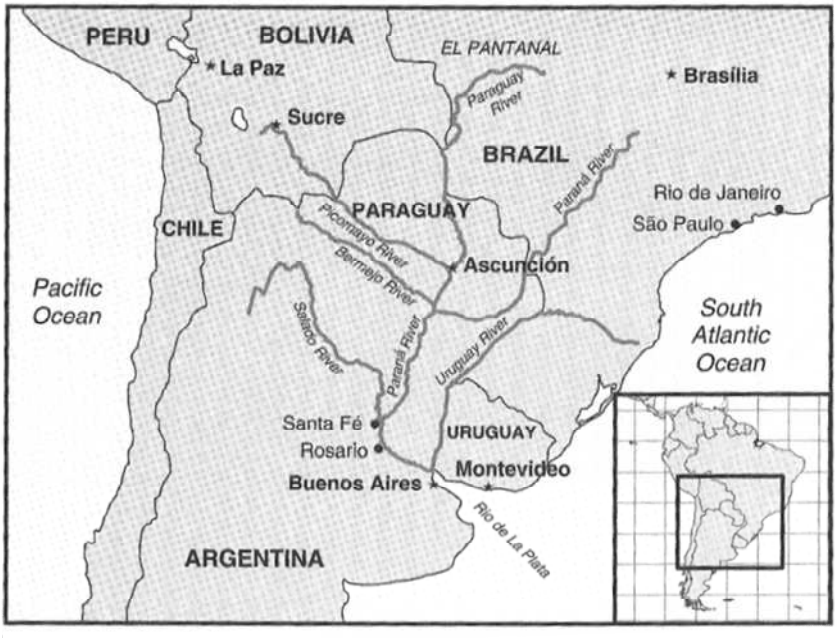

Figure 7 – La-Plata River Basin[39]

Much of this exported power goes to Brazil, where the economy is robustly growing, and the country increasingly needs electric power. Part of the original agreement allowed each country to charge the other for electricity based upon a mutual acceptable price. However, the current utility rate that was determined, as part of the original agreement, is no longer in line with regional electricity rates. This has created friction between the countries that have diverging interests in the use of the river; one as a method to develop the region, the other as a current source of funding. Despite the original success of the 1991 La-Plata River agreements, Brazil and Paraguay are encountering new challenges on reportedly inequitable utility rates that must be addressed to avoid future confrontations.[40]

Similarly the US and Mexico still have a contentious relationship over the Colorado and Rio Grande Rivers despite the current agreement over the Colorado. Every riparian nation will have their own evolving plans for use of water, and

agreements are only successful as long as these plans do not interfere with the plans of all other signatories. Even the success of the Okavango River demonstrates that water disagreements and resolution need constant renewal and manipulation since growing populations and increased requirements for riparian nations can make static agreements only temporary solutions to ever changing situations.

Other major disputes and conflicts over water currently involve nations or communities that to some extent have similar patterns to the Indus, La-Plata and Colorado Rivers' scenarios. The most complicated issue surrounds the access and use of the Jordan River by the Israeli and Palestinian people. Since Israel occupied the West Bank, the Jewish nation has siphoned off a much larger percentage of the Jordan River (Figure 8) that the Palestinian people; removing fresh water from surrounding underground aquifers and the Sea of Galilee at an alarming rate. In fact, the daily amount of water used by the typical Palestinian, around 35 liters per day, is considered less than necessary for a person to survive in the modern world, exacerbating the abject poverty in the occupied territories.[41] The increasing rate in which the underground aquifers are being pumped for Israeli citizens has made many Palestinian as well as Israeli wells dry, and this added pressure has only made a difficult situation even more dire.

Figure 8 – Jordan River[42]

Part of the tension is based upon the inequity of water allotment of the past forty years. For example, while Israel drilled 36 wells in the 22 years after the 1967 war, the Palestinian governed lands in the West Bank have been forbidden to drill any wells.[43] The overuse of these sources has actually cut off the Dead Sea from the downstream waterways leading to higher salinity levels in many wells and remaining aquifers. Although Israel is currently building several desalination plants, the growing needs of the Israeli population will continue to stress current water resources for both the Israeli and Palestinian people.

As access to fresh water dwindles for the Palestinian people, there has been increased speculation that violence will expand solely due to this issue. Yet freshwater availability is just one issue in a complicated situation between several of the Arab nations and Israel. To presume that water will be the root cause or sole reason that the

Palestinians either fight or are able to organize regional and global military pressure against Israel is shortsighted. The friction between these groups is based upon a multitude of aspects ranging from religious beliefs, to available arable land to recognition of existence. Water access is merely another aspect of a complex regional problem that will not be resolved without external intervention.

Water Conflict and Current US Policy

The Jordan River, the Tigris and Euphrates River basin and the Nile River each have stoked nationalistic tendencies. However, none of these brewing conflicts is completely about water access. Although any direct connection between water scarcity and the outbreak of conflict can be debated, there remains the strong possibility that water availability and quality can be a major contributor to a nation's willingness to use force to resolve the dispute. The United States' current position of not recognizing this potential displays ignorance on just how important water is to enflaming conflicts in certain geographical hot spots of the world. This stance also understates the importance that economic and more obvious diplomatic efforts can strengthen the role that the US can play in alleviating tensions around the world.

For example, the current unease between Turkey, Syria and Iraq over the damming of both the Tigris and Euphrates Rivers may not lead to all out wars, but it does cause significant difficultly in working relationships beyond just fresh water access issues between the three countries. For the Unites States, this situation has become even more challenging since two of the three countries, Iraq and Turkey, are major allies.

There remains hope that tensions can resolve themselves without American military or diplomatic intervention. For example, in the early 1960s, Turkey embarked on the development of southeastern Turkey, hoping to create stability and increase prosperity to the most impoverished region of the nation. The Southeastern Anatolia Project (GAP) raised the acreage of crops significantly and created over 3.3 million jobs due to the development of the Euphrates River basin in the first 30 years.[44]

The GAP initially caused the situation to worsen due to Turkey's inward looking development concerns. Turkey underestimated the effect of filling reservoirs and not communicating their intentions to Syria and Iraq. However, in the 1980s, Turkey with Iraq and later Syria formed the Joint Technical Committee (JTC) where discussions of water related projects and timelines could be vented publically and solutions to problems proposed. The JTC facilitated a method to resolving future conflicts and did ease tensions. Nevertheless, the situation remains uneasy especially on the impact of future water projects on both the Tigris and Euphrates Rivers.[45]

Currently, the United States and other leading countries have not entertained the idea of facilitating talks between the three nations for a stronger common solution. Part of the reason may be that external powers such as European nations, China and Russia may still consider this issues as an internal matter or not diplomatically feasible. However, such intervention could thwart offensive actions against the dams in Turkey and could even bolster the Global War on Terror (GWOT) through stronger partnerships against known groups such as the PKK and Al-Qaeda. The United States for example would be able to make significant diplomatic inroads toward resolving complicated issues far beyond the original water resource issue.

Proposal for Future U.S. Policy

With the changing of the administration in the United States, there is a strong possibility of significant changes in international policies. The NSS and other overarching strategic plans will be rewritten for the new Obama Administration and will likely steer away from a military emphasis on GWOT maintained in the previous two versions in 2002 and 2006. The administration may promote a policy where diplomatic, informational and economic tools can be better employed against the root causes of terrorism and violent confrontations. Furthermore, it will likely contain a stronger emphasis on international discussion and correspondence to tackle difficult issues revolving around potential and ongoing disputes. Despite the probable change in approach, terrorism and its causes will remain the strategic issue that demands primary attention.

The Obama administration would do well to promote an international consensus on mitigating resource related disputes. Conflicts where access to and use of fresh water are a contributing factor to regional tensions have demonstrated a potential for exacerbating problems to America's national security. Additionally, water scarcity related issues may also assist America in exploiting breakthroughs in more complicated international predicaments.

The United States could build on the water scarcity problems as leverage for more complicated regional issues. Exploiting the water usage issues between Iraq, Syria and Turkey for example, the US could insert itself as a facilitator for better regional and one-on-one relations. This could begin with restarting talks about the "Pipeline for Peace", a plan first proposed by the Turkish government to pipe water from the mountains of eastern Turkey through Iraq to other oil-rich Gulf states. Turkey first

proposed the program as a way to gain favorable terms for oil as well as promote the alternative of having oil pipelines run through Turkey to the Mediterranean Sea instead of other nations. However, funding and prolonged regional disputes and conflicts forced the Turkish government to shelve the idea in the 1980s.[46]

The US could attempt to reignite the Pipeline For Peace as an inroad for these nations to resolve the diverse border, terrorism and trade related issues (Figure 9). Using financial, economic and diplomatic attributes, the US could bring a framework to make this proposal actually come to fruition. Iraq and the other Gulf states would likely welcome a readily available source of water from the Seyan and Ceyan Rivers, which are both within Turkey's borders.[47] Turkey could possibly use the geographic oil access for both internal needs and as a mechanism for cheap transport through to Europe. This in turn may open up the possibility of resolving the other issues between the three countries including the support of the PKK, illegal immigration, Kurdish homeland concerns and trade. Prolonged success may even assist the US in addressing even larger regional issues such as the Palestinian/Israeli conflict, Lebanon and the Iranian Islamic regime.

A positive step in this process would be to formulate in the upcoming NSS a statement concerning fresh water availability. The Obama administration could then build upon this statement policies and goals that the United States could use diplomatic and economic capabilities to resolve regional disputes. The administration would develop situational dependent strategies since each conflict has unique issues. However, the main strategic theme would be that the United States would consider

using fresh water access and use issues as a springboard to bolster their position in resolving larger strategic problems within the region.

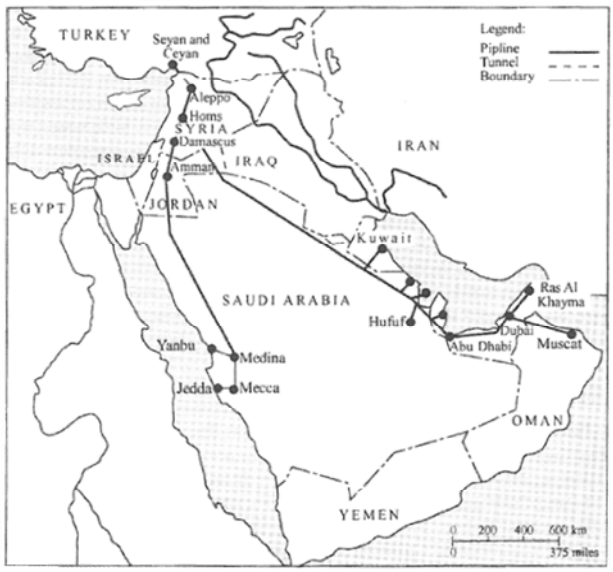

Figure 9 – Turkish Peace Pipeline[48]

A possible statement to be inserted in the NSS could be as follows:

> It is in no entities best interest to go to war over water. The United States recognizes the vital importance of access to clean, fresh water to all nations. Water is a lifeline that cannot be severed without jeopardizing regional security as well as complicating America's national interests. The United States must act through a multitude of approaches to identify peaceful solutions that ensure no nation goes thirsty or withers to the point where the battlefield is considered more advantageous than the construction of a shared canal.

Although terrorism will likely remain at the forefront of national security, natural resource conflicts have the possibility of contributing to regional instability. Oil for example has recently and repeatedly demonstrated that weakly governed countries may become prone to internal strife and regional conflict. For example, the recent completion of oil pipelines in Chad brought much-needed funds to one of the world's most impoverished countries. Through an agreement with the World Bank, Chad was

able to finance the construction provided the profits would be used for education and development efforts.

The Chadian president had other plans once the oil began to flow. During one period of increased tensions with neighboring Sudan, the Chadian Government diverted these funds from civilian use to weapon purchases to ensure the current regime could remain in power.[49] This in turn further fueled instability within the region and promoted the tendency for American goals and objectives in global economic and development policies to be hindered.

The "resource curse" can raise the possibility of endangering national security objectives or at a minimum create the prospect of conflict. Water may not fit this model in the same way as oil; however, there remains the tendency for such resources, at a minimum to impede US national security goals. This should make policymakers consider having a specific organization to focus on water policy issues.

A dedicated policy for international fresh water is actually not a new phenomenon. The U.S. State Department was actually designated as the lead agency under U.S. Code Title 22, Chapter 38, which states the "Secretary of State shall designate a special coordinator for Water Policy Negotiations and Water Resource Policy". This position is the focal point for coordination of water resource policies, representation in disputes and strategic planner for international problems posed by lack of fresh water supplies.[50]

The Obama administration could restructure this position and use it to focus on water resource issues in potential conflict areas and existing hotspots. Instead of making it what is perceived as a secondary issue function, the administration could

bolster it to the front line in those regions or situations where it could potentially pay the highest dividend. It could be used effectively in both the Tigris-Euphrates and Jordan River basin predicaments to open up dialogue between nations, which could positively influence US international strategy.

Conclusion

This paper has attempted to demonstrate that fresh water access is a strategic issue among other important factors that raise tensions amongst nations, but are mainly overshadowed by other legitimate concerns. Water can be a strategic weapon and its access may be a scapegoat for larger problems, forcing nations to consider the threat of force when access has been impeded or potentially impeded.

However, crises have been averted by those nations who realize war over such resources does not resolve the obvious needs of each nation. In fact, conflict over water as a central issue has not happened. This is not to say that water access issues should be ignored or relegated to a sideshow concern on the US national security agenda.

The United States must acknowledge that although wars based on access to useable freshwater are typically secondary issues of larger problems, such potential conflicts can alter the balance of power within a region and be a threat to American national security. Water based disputes may even offer the United States an opportunity to gain allies and build a solid reputation as a facilitator for regional agreements and partnerships. At a minimum, the US must define how conflict can be averted and provide a basic framework on how to resolve these situations before they become a threat to regional stability and concern to US national security.

Endnotes

[1] Mostafa Dolatyar and Tim Gray, *Water Politics In The Middle East: A Conflict for Conflict or Co-Operation* (Houndmills, UK: MacMillan Press LTD, 2000), xi.

[2] Michael T. Klare, *Resource Wars: The New Landscape of Global Conflict* (New York: Henry Holt and Company, 2001), 19.

[3] Dolatyar, *Water Politics In The Middle East: A Conflict for Conflict or Co-Operation,* 24.

[4] Ibid., 24.

[5] Robert Clarke and Robin King, *The Water Atlas* (New York: The New Press, 2004), 76.

[6] Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Penguin Group, 1993), 258.

[7] Harris Blackwood, "Endangered Species Act Targeted During Drought*," Gainesville Times,* October 12, 2007*.*

[8] Peter Glick, "Water and Conflict," *International Security* 18, no. 1 (Summer 1993): 86.

[9] Miriam R. Lowi, *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin* (Cambridge, UK: Cambridge University Press, 1995), 187.

[10] Thomas F. Homer-Dixon, *Environment, Scarcity and Violence* (Princeton, NJ: Princeton University Press, 1999), 4.

[11] Arun P. Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins* (New York: United States Institute of Peace Press, 1999), 55-56.

[12] Ibid., 55.

[13] Ibid., 68-69.

[14] Ibid., 69.

[15] Arnon Soffer, *River of Fire: The Conflict Over Water in the Middle East* (Lanham: Rowman and Littlefield Publishers Inc., 1999), 61.

[16] Soffer, *River of Fire: The Conflict Over Water in the Middle East*, 49-50.

[17] Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins*, 60-61.

[18] Homer-Dixon, *Environment, Scarcity and Violence*, 140-141.

[19] Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins*, 126.

[20] Ibid., 138-139.

[21] Center For Strategic Research, *Facts About Euphrates-Tigris Basin* (Ankara, Turkey: Center For Strategic Research, 1996), 7.

[22] Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins*, 141-144.

[23] "Indus River," *Wikipedia*, http://en.wikipedia.org/wiki/Indus_River, (Accessed December 21, 2008).

[24] Klare, *Resource Wars: The New Landscape of Global Conflict*, 183.

[25] Ibid., 184-185.

[26] Homer-Dixon, *Environment, Scarcity and Violence*, 5.

[27] Klare, *Resource Wars: The New Landscape of Global Conflict*, 185.

[28] Clarke, *The Water Atlas*, 76.

[29] "Colorado River," *Wikipedia*, http://en.wikipedia.org/wiki/Colorado_River, (Accessed November 17, 2008).

[30] Bob Ribokas*, "Grand Canyon Explorer The Colorado River,"* http://www.bobspixels.com/kaibab.org/misc/gc_coriv.htm, (Accessed November 17, 2008).

[31] "Colorado River," *Wikipedia*, http://en.wikipedia.org/wiki/Colorado_River, (Accessed November 17, 2008).

[32] Clarke, *The Water Atlas*, 75.

[33] Anthony R. Turton and Anton Earle, "Public Participation In The Development of a Management Plan for An International River Basin: The Okavango Case," in *Enhancing Participation and Governance in Water Resource Management* (Tokyo: United Nations University, 2005), 33-34.

[34] Libor Jansky and Juha Uitto, *Enhancing Participation and Governance in Water Resources Management, Conventional Approaches and Information Technology* (New York: United Nations University, 2005), 38.

[35] Turton, 38-39.

[36] Ibid., 40.

[37] Ibid., 40-49.

[38] Klare, *Resource Wars: The New Landscape of Global Conflict*, 188.

[39] Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins*, 27.

[40] Ibid., 48-52.

[41] Clarke, *The Water Atlas*, 79.

[42] Elhance, *Hydro-Politics in the 3rd World: Conflict and Cooperation in International River Basins*, 88.

[43] Lowi, *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin*, 187-188.

[44] Center For Strategic Research, *Facts About Euphrates-Tigris Basin*, 10-11.

[45] Ibid.

[46] Soffer, *River of Fire: The Conflict Over Water in the Middle East*, 237-242.

[47] Ibid.

[48] Ibid., 238.

[49] Lisa Margonelli, "The Short, Sad History of Chad's 'Model' Oil Project," http://pipeline.blogs.nytimes.com/tag/world-bank/, *The New York Times*, Pipeline, Opinion, February 12, 2007 (Accessed December 21, 2008).

[50] *Foreign Relations and Intercourse*, USC 22, Sec. 2686a (2001), cited in Roy C. Bierwirth, *U.S. International Fresh Water Policy – Need, Analysis and Recommendation*, Strategic Research Paper (Carlisle Barracks, PA: U.S. Army War College, 2002), 10.